STATEMENT

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before

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It is an honor to be called to appear as a scientific witness before this important and distinsuished Comittee. My terms of reference are, as I understand them, to report on certain significant aspects of research on cannabis -- of which marijuana and hashish are the chief products -- and on the findings of the United Nations Laboratory and of national scientists collaborating with it in the UN research program. After giving you a brief outline of recent important developments in the field of cannabis research, I shall, of course, be pleased to answer, as far as I can, any questions which the members of this Committee may care to put to me.

Just before leaving Geneva, I made telephone calls to a number of scientists in different countries who have been collaborating on various aspects of cannabis research. I had lengthy conversations with Professor W.D.M. Paton of Oxford University; with Dr. Ole Rafaelsen of Denmark; with Professor C. Miras of the University of Athens; and with Professor Cornelius Salamink of the University of Utrecht in the Netherlands. The statement I have prepared refers to some of the recent scientific findings on the subject, and, I believe, accurately reflects their views, so far as their own research is concerned.

As you know, careful and profound chemical and pharmacological studies of cannabis have also been carried out in this country, particularly under the auspices of the National Institute for Mental Health. The many oustanding scientists who have worked on these studies include Professor Harry Isbell, Professor Leo Hollister, Professor Coy Waller, Dr. Julius Axelrod, Dr. Glenn Kipplinger, and others. Their research, in general, corroborates the research of the European scientists working on cannabis. I regret that there was no time to interview these outstanding scientists before my appearance.

Among the scientists working in the field it would seem that there is a general consensus that cannabis is dangerous -- opinions differ, however, on the degree of the danger to the individual and to society. In my opinion, it seems that, as progressively more scientific facts are discovered about cannabis, the more one becomes aware of its potential dangers.

In spite of the intensive research carried out in many countries, much remains to be elucidated in connection with the chemistry of the components of cannabis and their effects on the body. . . There is no doubt that this is a highly complex field -- much more so than was previously supposed. For example, it had been believed for some decades that the main components of cannabis were some few substances, mainly cannabinoids, of which only tetrahydrocannabinol, or THC as we call it, was the active principle. However, there is now evidence that cannabis contains a very large number of substances -- at least 50. The great majority of these components have not yet been isolated and characterized, and their pharmacological activity -- or inactivity -- remains to be determined.

In our Laboratory we have recently found indications of the presence in cannabis of nitrogen-containing substances. By varying the classical extraction procedures, certain spots were obtained on thin-layer chromatograms which led us to suspect that cannabis contained components of an alkaloidal nature. It was also noted that these alkaloidal substances were present in greater amounts in the actual plant material than in the resin. Application of the usual tests for alkaloids was found by Dr. H. Samrah of Egypt to give positive reactions. Similar results were obtained by Professor O. Aguar of the University of Madrid. These alkaloidal substances have still to be isolated and characterized. Simultaneously and independently, Professor C. Salemink of the University of Utrecht reported on quarternary nitrogen bases in cannabis seeds, and, very recently, on the presence of indole compounds in cannabis itself. (Indole compounds are nitrogen-containing organic compounds.)

There is no doubt that the presence of nitrogen-containing compounds in cannabis opens a highly interesting field in connection with the pharmacological activity of cannabis because such plant substances are frequently poisonous.

Knowledge of the short and long-term effects of cannabis is far from comprehensive.

According to Dr. A.M. Campbell and his colleagues of the Bristol Royal United Hospital, there is significant evidence of cerebral atrophy in young cannabis smokers.

Professor C. Miras of the University of Athens has done considerable research on the effects of cannabis on man. As subjects he uses chronic hashish smokers only -- because he believes that there is a great risk of damage if the subjects have not previously taken hashish on a regular basis.

Dr. O. Rafaelsen of the Central State Hospital in Copenhagen, Denmark, has found that there is considerable impairment of driving ability after oral ingestion of cannabis.

Here it should be noted that the effects of cannabis when smoked are considerably greater than when cannabis is taken orally. This may be due to the fact that -- as reported recently by Professor Salemink of the Netherlands -- the components of cannabis may in part be destroyed in the digestive tract by intestinal bacteria.

A complicating factor in assessing reports on the abuse of cannabis , particularly by young people, is that those who claim to have smoked cannabis, may not, in fact have done so -- because cannabis in the illicit traffic is often highly adulterated with tobacco and other substances, and sometimes it is even completely falsified. In the illicit traffic, it has been reported that a considerable percentage of the samples seized did not contain any cannabis.

As I have pointed out, the activity of cannabis has thus far been attributed entirely to the tetrahydrocannabinol, or THC, which it contains. While it is true that THC is active pharmacologically, it is highly probable that other components of cannabis may also be active. In the Netherlands, a sample of cannabis was found to be highly active despite the fact that no THC was present.

Although an adequate picture of the fate of cannabis in the body remains to be determined, it should be noted that cannabis is only partially excreted by the organism. Professor Paton of Oxford University has found that some of its components accumulate in the fatty tissues of the body.

For a number of years now the United Nations Laboratory has been engaged in research on cannabis. Acting on a directive of the UN Commission on Narcotic Drugs, we have, in fact, accorded this work the highest priority. Governments have indicated their interest by providing large numbers of cannabis samples for our research, and also by nominating national scientists to participate in the program. These scientists, performing their research on a voluntary basis, have made important contributions to the program .

The United Nations Laboratory concentrates its attention on those aspects of the research which cannot easily be carried out by national laboratories and, in this connection, its most important function is to coordinate, as required and as far as possible, the research being carried out in various countries within the framework of the program. In particular, we seek to avoid unnecessary duplication of effort. The Laboratory cooperates with researchers in the United States of America through the National Institute of Mental Health, and it is also in close contact with the Laboratory Division of the Bureau of Narcotics and Dangerous Drugs. In the research program, the Laboratory provides its national collaborating scientists with the basic research materials - samples of cannabis, cannabis resin, and cannabis seeds, and it also distributes THC which has been made available through the National Institute of Mental Health.

It is well known that the chemical composition of cannabis varies according to the ecological conditions of the region where it is grown, and that, after harvesting, changes occur with time and according to the conditions of storage. The Laboratory has, therefore, organized an ecological study of the variations in the amount and potency of cannabis resin according to ecological conditions. For this purpose, cannabis

seeds from the same batches are being cultivated under carefully controlled conditions in various climatic regions. The preliminary studies have yielded some highly interesting results. It has, for instance, been found that the cannabis cultivated experimentally in Iceland and Norway, from seeds of South African origin, contains appreciable amounts of THC. These findings contradict the previously held belief that cannabis grown in temperate or cold regions is not pharmacologically active. It is our hope that this ecological study will be completed towards the end of next year.

The systematic analysis at regular intervals of the samples of cannabis in the United Nations collection is now being undertaken in order to determine the nature and the extent of changes occurring in composition with time.

The variations in the chemical results obtained in early research on cannabis were probably due, at least in part, to the variations in the cannabis samples used by different scientists. To overcome this difficulty, the United Nations Laboratory has, from time to time, prepared reference samples of cannabis to be used for comparative purposes.

It may perhaps be of interest to mention that, in the illicit traffic, cannabis is now being encountered in a new form --known as "liquid hashish" or "marijuana oil." This is many times as potent as good grade hashish and is potentially very dangerous. The exact technique for producing liquid hashish is not known, but, according to the BNDD, the hashish is apparently extracted with an organic solvent which is subsequently evaporated, and a vegetable oil is added to the residue. Earlier this year, our Laboratory received interesting samples of some "liquid hashish" or "marijuana oil" seized in Norway. It was said to be of Middle Asian origin, and it had an extraordinarily high concentration of THC -- 66.3 per cent, as against about 10 per cent in ordinary hashish and 2 per cent in marijuana.

In spite of the progress made in recent years in cannabis research, much still remains to be done before we have an adequate understanding of the nature and effects of this complex plant. Very considerable research is necessary -- particularly in order to isolate and characterize all the relevant constituents of cannabis; to definitively establish the active principles to study the pharmacological effects of cannabis and its fate in the body; and also to determine the chemical transformations which occur in cannibis when it is smoked.

I feel, therefore, that every effort should be made to accelerate relevant research so that it may be possible, within the near future, to draw sound scientifically based conclusions on cannabis -- conclusions which would be of value to national and international bodies in their consideration of the control of cannabis.